

WHAT IS CLAIMED IS:

1. An isolated protein comprising the sequence of amino acids set forth in Fig. 1A.
2. A nucleic acid comprising a nucleotide sequence encoding CON6 HIV gp160 protein, wherein said nucleotide sequence comprises codons optimized for expression in human cells.
3. The nucleic acid according to claim 2 wherein said nucleic acid comprises the nucleotide sequence set forth in Fig. 1D.
4. A nucleic acid comprising a nucleotide sequence encoding subtype C ancestral HIV envelope protein, wherein said nucleotide sequence comprises codons optimized for expression in human cells.
5. The nucleic acid according to claim 4 wherein said nucleic acid comprises the nucleotide sequence set forth in Fig. 6A.
6. A nucleic acid comprising a nucleotide sequence encoding subtype C consensus HIV envelope protein, wherein said nucleotide sequence comprises codons optimized for expression in human cells.
7. The nucleic acid according to claim 6 wherein said nucleic acid comprises the nucleotide sequence set forth in Fig. 6B.
8. An isolated protein comprising the sequence of amino acids set forth in Fig. 6C or 6D.

9. A nucleic acid comprising a nucleotide sequence encoding a subtype C consensus HIV gag protein, wherein said nucleotide sequence comprises codons optimized for expression in human cells.

10. The nucleic acid according to claim 9 wherein said nucleic acid comprises the nucleotide sequence set forth in Fig. 13E.

11. A nucleic acid comprising a nucleotide sequence encoding a subtype C consensus HIV nef protein, wherein said nucleotide sequence comprises codons optimized for expression in human cells.

12. The nucleic acid according to claim 11 wherein said nucleic acid comprises the nucleotide sequence set forth in Fig. 13F.

13. A nucleic acid comprising a nucleotide sequence encoding Group M consensus HIV envelope protein, wherein said nucleotide sequence comprises codons optimized for expression in human cells.

14. The nucleic acid according to claim 13 wherein said nucleic acid comprises the nucleotide sequence set forth in Fig. 14B.

15. A nucleic acid comprising a nucleotide sequence encoding subtype A consensus HIV envelope protein, wherein said nucleotide sequence comprises codons optimized for expression in human cells.

16. The nucleic acid according to claim 15 wherein said nucleic acid comprises the nucleotide sequence set forth in Fig. 18B.

17. A nucleic acid comprising a nucleotide sequence encoding Group M consensus HIV gag protein, wherein said nucleotide sequence comprises codons optimized for expression in human cells.

18. The nucleic acid according to claim 17 wherein said nucleic acid comprises the nucleotide sequence set forth in Fig. 19A .

19. A nucleic acid comprising a nucleotide sequence encoding Group M consensus HIV pol protein, wherein said nucleotide sequence comprises codons optimized for expression in human cells.

20. The nucleic acid according to claim 19 wherein said nucleic acid comprises the nucleotide sequence set forth in Fig. 19B.

21. A nucleic acid comprising a nucleotide sequence encoding Group M consensus HIV nef protein, wherein said nucleotide sequence comprises codons optimized for expression in human cells.

22. The nucleic acid according to claim 21 wherein said nucleic acid comprises the nucleotide sequence set forth in Fig. 19C.

23. A nucleic acid comprising a nucleotide sequence encoding subtype C consensus HIV pol

protein, wherein said nucleotide sequence comprises codons optimized for expression in human cells.

24. The nucleic acid according to claim 23 wherein said nucleic acid comprises the nucleotide sequence set forth in Fig. 19D.

25. A nucleic acid comprising a nucleotide sequence encoding subtype B consensus HIV gag protein, wherein said nucleotide sequence comprises codons optimized for expression in human cells.

26. The nucleic acid according to claim 25 wherein said nucleic acid comprises the nucleotide sequence set forth in Fig. 20A.

27. A nucleic acid comprising a nucleotide sequence encoding subtype B consensus HIV envelope protein, wherein said nucleotide sequence comprises codons optimized for expression in human cells.

28. The nucleic acid according to claim 27 wherein said nucleic acid comprises the nucleotide sequence set forth in Fig. 20B.

29. An isolated protein comprising the sequence of amino acids set forth in Fig. 20C or 20D.

30. An isolated protein comprising the sequence of amino acids set forth in Fig. 26A .

31. A nucleic acid comprising a nucleotide sequence that encodes the protein according to claim 30.

32. The nucleic acid according to claim 31 wherein said nucleic acid comprises the nucleotide sequence set forth in Fig. 26B.

33. An isolated protein comprising the sequence of amino acids set forth in Fig. 28B.

34. A nucleic acid comprising a nucleotide sequence encoding the protein according to claim 33.

35. The nucleic acid sequence according to claim 34 wherein said nucleic acid comprises the nucleotide sequence set forth in Fig. 28C.

36. An isolated protein comprising the sequence of amino acids set forth in Fig. 29B.

37. A nucleic acid comprising a nucleotide sequence encoding the protein according to claim 36.

38. The nucleic acid sequence according to claim 37 wherein said nucleic acid comprises the nucleotide sequence set forth in Fig. 29C.

39. An isolated protein comprising the sequence of amino acids set forth in Fig. 30B.

40. A nucleic acid comprising a nucleotide sequence encoding the protein according to claim 39.

41. The nucleic acid sequence according to claim 40 wherein said nucleic acid comprises the nucleotide sequence set forth in Fig. 30C.

42. An isolated protein comprising the sequence of amino acids set forth in Fig. 31B.

43. A nucleic acid comprising a nucleotide sequence encoding the protein according to claim 42.

44. The nucleic acid sequence according to claim 43 wherein said nucleic acid comprises the nucleotide sequence set forth in Fig. 31C.

45. An isolated protein comprising the sequence of amino acids set forth in Fig. 32B.

46. A nucleic acid comprising a nucleotide sequence encoding the protein according to claim 45.

47. The nucleic acid sequence according to claim 46 wherein said nucleic acid comprises the nucleotide sequence set forth in Fig. 32C.

48. An isolated protein comprising the sequence of amino acids set forth in Fig. 33B.

49. A nucleic acid comprising a nucleotide sequence encoding the protein according to claim 48.

50. The nucleic acid sequence according to claim 49 wherein said nucleic acid comprises the nucleotide sequence set forth in Fig. 33C.

51. An isolated protein comprising the sequence of amino acids set forth in Fig. 34B.

52. A nucleic acid comprising a nucleotide sequence encoding the protein according to claim 51.

53. The nucleic acid sequence according to claim 52 wherein said nucleic acid comprises the nucleotide sequence set forth in Fig. 34C.

54. An isolated protein comprising the sequence of amino acids set forth in Fig. 35B.

55. A nucleic acid comprising a nucleotide sequence encoding the protein according to claim 54.

56. The nucleic acid sequence according to claim 55 wherein said nucleic acid comprises the nucleotide sequence set forth in Fig. 35C.

57. An isolated protein comprising the sequence of amino acids set forth in Fig. 36B.

58. A nucleic acid comprising a nucleotide sequence encoding the protein according to claim 57.

59. The nucleic acid sequence according to claim 58 wherein said nucleic acid comprises the nucleotide sequence set forth in Fig. 36C.

60. An isolated protein comprising the sequence of amino acids set forth in Fig. 37B.

61. A nucleic acid comprising a nucleotide sequence encoding the protein according to claim 60.

62. The nucleic acid sequence according to claim 61 wherein said nucleic acid comprises the nucleotide sequence set forth in Fig. 37C.

63. An isolated protein comprising the sequence of amino acids set forth in Fig. 38B.

64. A nucleic acid comprising a nucleotide sequence encoding the protein according to claim 63.

65. The nucleic acid sequence according to claim 64 wherein said nucleic acid comprises the nucleotide sequence set forth in Fig. 38C.

66. An isolated protein comprising a CF or CFI form of the amino acid sequence set forth in any one of Figs. 39A-127A.

67. A nucleic acid comprising the nucleotide sequence set forth in Fig. 39B.

68. A nucleic acid comprising the nucleotide sequence set forth in Fig. 40B.

69. A nucleic acid comprising the nucleotide sequence set forth in Fig. 41B.

70. A nucleic acid comprising the nucleotide sequence set forth in Fig. 42B.

71. A nucleic acid comprising the nucleotide sequence set forth in Fig. 43B.

72. A nucleic acid comprising the nucleotide sequence set forth in Fig. 44B.



73. A nucleic acid comprising the nucleotide sequence set forth in Fig. 45B.

74. A nucleic acid comprising the nucleotide sequence set forth in Fig. 46B.

75. A nucleic acid comprising the nucleotide sequence set forth in Fig. 47B.

76. A nucleic acid comprising the nucleotide sequence set forth in Fig. 48B.

77. A nucleic acid comprising the nucleotide sequence set forth in Fig. 49B.

78. A nucleic acid comprising the nucleotide sequence set forth in Fig. 50B.

79. A nucleic acid comprising the nucleotide sequence set forth in Fig. 51B.

80. A nucleic acid comprising the nucleotide sequence set forth in Fig. 52B.

81. A nucleic acid comprising the nucleotide sequence set forth in Fig. 53B.

82. A nucleic acid comprising the nucleotide sequence set forth in Fig. 54B.

83. A nucleic acid comprising the nucleotide sequence set forth in Fig. 55B.

84. A nucleic acid comprising the nucleotide sequence set forth in Fig. 56B.

85. A nucleic acid comprising the nucleotide sequence set forth in Fig. 57B.

86. A nucleic acid comprising the nucleotide sequence set forth in Fig. 58B.

87. A nucleic acid comprising the nucleotide sequence set forth in Fig. 59B.

88. A nucleic acid comprising the nucleotide sequence set forth in Fig. 60B.

89. A nucleic acid comprising the nucleotide sequence set forth in Fig. 61B.

90. A nucleic acid comprising the nucleotide sequence set forth in Fig. 62B.

91. A nucleic acid comprising the nucleotide sequence set forth in any one of Figs. 63B-84B, 65D, 67D and 68D.

92. A nucleic acid comprising the nucleotide sequence set forth in any one of Figs. 85B-106B, 88D, 90D and 92D.

93. A nucleic acid comprising the nucleotide sequence set forth in any one of Figs. 107B-127B, 109D, 111D and 112D.

94. A vector comprising the nucleic acid according to any one of claims 2-7, 9-28, 31, 32, 34, 35, 37, 38, 40, 41, 43, 44, 46, 47, 49, 50, 52, 53, 55, 56, 58, 59, 61, 62, 64, 65 and 67-93.

95. A composition comprising at least one protein or nucleic acid according to any one of claims 1-93 and a carrier.

96. A method of inducing an immune response in a mammal comprising administering to said mammal an amount of at least one protein and/or nucleic acid according to any one of claims 1-93 sufficient to effect said induction.